WHAT IS CLAIMED IS:

1. An apparatus for processing a digital intermediate frequency signal in a software-defined radio system, which is driven by software, the apparatus comprising:

a digital frequency mixer for, upon receiving a digitalized intermediate frequency signal, converting the received intermediate frequency signal to a baseband signal;

a receiver filter for removing a high-band signal from the converted baseband signal;

a receiver filter building block for controlling implementation of the receiver filter to support multiple communication standards;

an implementation controller for controlling implementation of the receiver filter building block; and

a filter coefficient calculator for receiving information about a specification of the receiver filter from the implementation controller, calculating a coefficient of the receiver filter using the received information, and providing the calculated coefficient of the receiver filter to the implementation controller.

2. The apparatus as claimed in claim 1, further comprising:

a radio frequency (RF) signal processor for converting an externally received signal to an analog intermediate frequency signal; and

an analog-to-digital converter for converting the analog intermediate frequency signal to a digital intermediate frequency signal, and sending the converted digital intermediate frequency signal to the digital frequency mixer.

3. The apparatus as claimed in claim 2, wherein the receiver filter building block controls the implementation of the receiver filter to make the receiver filter share common resources according to the multiple communication standards, and select additionally required resources other than the shared resources by a switching operation.

4. The apparatus as claimed in claim 3, wherein the receiver filter building block controls the implementation to share the common resources by including a receiver filter having a relatively small length in a resource of a receiver filter having a largest length.

5. The apparatus as claimed in claim 4, wherein the receiver filter building block designs the receiver filter as a finite impulse response filter having a discrete coefficient so as to make the receiver filter reconfigurable.

6. The apparatus as claimed in claim 5, wherein the receiver filter building block makes the coefficients of the receiver filter comprised of summations or differences of power-of-2 terms, shares shift and summation resources of a common coefficient, and implements all coefficients, apart from the communication standard caused by an addition of a shift or a summation.

7. The apparatus as claimed in claim 6, wherein the receiver filter comprises:

a filter coefficient multiplier for multiplying the coefficients of the receiver filter;

a register corresponding to an order of the receiver filter;

a summator for performing an operation of the receiver filter; and

a multiplexer for supporting filter coefficients for the multiple communication standards simultaneously.

8. The apparatus as claimed in claim 7, wherein the multiplexer selects implementation of the receiver filter for one of the multiple communication standards according to an instruction of the implementation controller.

9. The apparatus as claimed in claim 8, wherein the receiver filter uses the multiplexer to reduce hardware, when the short receiver filter does not need to use the register.

10. The apparatus as claimed in claim 2, wherein the implementation controller constructs a trellis defining, as a cost, a saved quantity of hardware caused by shared resources after matching the short filter to the long filter, the trellis defining each status as a coefficient of the long filter having the short filter allocatable thereto.

11. The apparatus as claimed in claim 10, wherein the implementation controller eliminates an allocation method not maximizing a resource sharing, when resource allocation searching is performed for the constructed trellis.

12. The apparatus as claimed in claim 11, wherein the implementation controller distributes the resources of the coefficient of the receiver filter by dynamic programming based on the constructed trellis.

13. The apparatus as claimed in claim 12, wherein when the receiver filter is a linear phase finite impulse response filter, the implementation controller performs trellis searching for half the coefficients of the linear phase finite impulse response filter, and allocates the rest of the coefficients in a mirror image of the searching result.

14. The apparatus as claimed in claim 2, wherein the filter coefficient calculator externally receives information about the specification of the receiver filter, or calculates the coefficient of the filter adequate to a corresponding standard.

15. The apparatus as claimed in claim 14, wherein the filter coefficient calculator represents values allowed for each coefficient of the receiver filter as a linear combination, and calculates the coefficient of the receiver filter by linear programming for the linear combination.

16. The apparatus as claimed in claim 1, wherein the intermediate frequency is four times as high as the baseband frequency.

17. A digital filter, which is for a digital intermediate frequency signal processing apparatus, the digital filter comprising:

a multiplexer for supporting filter coefficients for multiple communication standards simultaneously;

a filter coefficient multiplier for multiplying the coefficients;

a register corresponding to an order; and

a summator for performing an operation,

the digital filter being constructed to share common resources according to the multiple communication standards, and select additionally required resources other than the shared resources by a switching operation.

18. The digital filter as claimed in claim 17, wherein the digital filter implements a corresponding coefficient with an external input or an internal filter coefficient calculator.

19. A method for processing a digital intermediate frequency signal in a software-defined radio system, which is driven by software, the method comprising:

(a) converting a digitalized intermediate frequency signal to a baseband signal, upon receiving the intermediate frequency signal;

(b) removing a high-band signal from the converted baseband signal;

(c) controlling implementation of a receiver filter performing (b) to support multiple communication standards;

(d) calculating a coefficient of the receiver filter using information about

a specification of the receiver filter, upon receiving the information from an implementation controller for controlling implementation of a receiver filter building block performing (c); and

(e) providing the calculated coefficient of the receiver filter to the implementation controller.

20. The method as claimed in claim 19, wherein (c) comprises:

sharing common resources according to the multiple communication standards, and then selecting additionally required resources by a switching operation.

21. The method as claimed in claim 20, wherein (c) comprises:

including a receiver filter having a relatively small length in a resource of a receiver filter having a longest length to share common resources.

22. The method as claimed in claim 21, wherein (d) comprises:

defining, as a cost, a saved quantity of hardware caused by the shared resources when matching the short receiver filter to the long receiver filter; and

constructing a trellis defining each status as a coefficient of the long receiver filter having the short receiver filter allocatable thereto.

23. The method as claimed in claim 22, wherein (d) comprises:

distributing the resources of the coefficients of the receiver filter by dynamic programming based on the trellis.

24. The method as claimed in claim 23, wherein (d) comprises:

externally receiving information about a specification of the receiver filter; and

calculating the coefficient of the receiver filter based on the input information.

25. A recording medium with a built-in program, which recording medium includes a digital intermediate frequency signal processing method for a software-defined radio system driven by software, the program comprising:

(a) a function of converting a digitalized intermediate frequency signal to a baseband signal, upon receiving the intermediate frequency signal;

(b) a function of removing a high-band signal from the converted baseband signal;

(c) a function of controlling an implementation of a receiver filter performing the function (b) to support multiple communication standards;

(d) a function of calculating a coefficient of the receiver filter using information about a specification of the receiver filter, upon receiving the information from an implementation controller for controlling implementation of a receiver filter building block performing the function (c); and

(e) a function of providing the calculated coefficient of the receiver filter to the implementation controller.